thirtieth meridian. The fogs of the Newfoundland banks are most prevalent in July and August, when they are encountered in that region twenty or more days in the month. The southern limit of icebergs on the banks, which reaches to about the fortieth parallel in June, contracts north of the forty-fifth parallel in August.

In the West Indies August marks the beginning of the hurricane season. The more severe storms of the month are, however, confined almost entirely to the more eastern islands of the West Indies, and any given locality in the Lesser Antilles and Porto Rico is subject to a hurricane visitation in August on an average of once in fifteen to twenty years. In the Gulf of Mexico the more severe storms of August pass west or north of west from the Caribbean Sea, and average about one in two years.

August is the month of maximum typhoon frequency in the Philippine Islands, the China Sea, and on the China and Japan coasts. These storms usually originate east or northeast of the Philippine Islands and move westward over the China Sea, or recurve northward to the China or Japan coasts. They compare in severity with the West Indian hurricanes.

In the United States August is a month of occasional thunderstorms from the Lake region and Ohio Valley, over the Middle Atlantic and New England States, and the rains in these districts, while usually of short duration, are at times excessive and attended by violent wind squalls. General storms of marked severity seldom occur on the Atlantic seaboard and the Great Lakes in August.

In the Southern States, east of the Mississippi River, the rainfall of the month is caused principally by minor disturbances, which advance from the Gulf of Mexico or the West Indies. Between the Mississippi River and the Rocky Mountains the month of August is usually dry and uneventful, with a tendency to strong and warm southwest winds.

Over the greater part of the country west of the Rocky Mountains, August rainfalls are light, and over the middle Plateau region and in California little or no rain falls.

WILLIS L. MOORE,
Chief U. S. Weather Bureau.

METEOROLOGICAL RECORDS IN OHIO.

We have received from Mr. Samuel P. Davidson, of London, Ohio, a copy of a very interesting climatological table pertaining to his station. Mr. Davidson has kept a record of the temperature and rainfall, dates of frost and other meteorological phenomena from 1852 to date. For thirty years of that time his thermometer was located in one and the same place. According to Mr. Davidson's record the present summer, in point of number of days with temperature of 90° and above, has been equaled once, and exceeded once, viz, in 1867 and 1854, when there were 30 and 38 days, respectively, with temperatures of 90° and above.

In response to Mr. Davidson's request for information as to other observers who have maintained a record for many years, we would say there are a number of voluntary meteorological observers in Ohio who have been reporting continuously for forty years and over. There may be other persons, as in the case of Mr. Davidson, who have made meteorological observations for many years.

Some of the oldest observers, in point of length of service, are mentioned below:

Mr. H. D. Gowey, of North Lewisburg, began making meteorological observations in 1852; he is still an active observer.

Mr. Gustavus A. Hyde, of Cleveland, Ohio, has been a voluntary observer about forty-five years. Mr. Hyde published a summary of his observations, privately, in 1896.

Prof. John Haywood, of Westerville, Ohio, has been observing continuously, if our record is correct, since 1858.

Dr. D. B. Cotton, of Portsmouth, Ohio, also began observations in the late fifties. Our record is not conclusive as to the date of Dr. Cotton's first report. He has likewise observed continuously to the present time.

Among others who have observed long and faithfully are Dr. J. B. Owsley, the present voluntary observer at Jacksonboro, Ohio (1868). Mr. Thomas Mikesell, Wauseon, Ohio (1870).

The Commonwealth of Ohio is fortunate in having within its limits an unusually large number of persons who have been observing the weather for many years.—*A. J. H.*

CLIMATOLOGICAL ATLAS OF THE RUSSIAN EMPIRE.

As a memorial volume commemorating the fiftieth anniversary of the foundation of the Central Physical Observatory founded by the Emperor Nicholas I on April 1, 1849, the present director general, M. Rykatcheff, has published a magnificent folio atlas, in which, by means of eighty-nine meteorological charts and fifteen graphical tables, he has presented the prominent features of the climate of the Russian Empire from Warsaw, on the extreme west, to Bering Strait, on the east, and from Teheran, on the south, to the Arctic Ocean on the north. This range of forty degrees in latitude and a hundred and sixty in longitude represents one of the most extensive compact meteorological systems in the world, and although stations are rather scarce in the interior of Siberia, yet the data are sufficient to justify drawing isobars and isotherms over the whole area. The volume contains thirteen monthly and annual charts, showing the pressure and resultant winds; also similar sets of thirteen charts for the temperature, vapor tension, and relative humidity, respectively. The total precipitation, viz, rain and snow, is shown on five charts for the four seasons and the year; the number of days of rainfall or snowfall and the quantity of cloudiness are also shown by similar sets of five charts each. Additional to these main charts are the following: The annual amplitude of the monthly mean temperature of the air, viz, the difference between the monthly means for July and January; the absolute maxima, the absolute minima, and the absolute range or amplitude for the whole period. All temperatures are reduced to sea level by allowing for a diminution of one-half degree, Centigrade, per 100 meters of elevation. Two charts are devoted to showing the seasons, or the months of maximum and minimum precipitation, which items are of peculiar importance to vegetation, and two other charts to the seasons of maximum and minimum number of rainy days, and two others to the seasons of maximum and minimum cloudiness. These six charts are of special interest in connection with vegetation. Finally three charts show the opening and closing of the rivers with ice. One chart, No. 83, shows the number of days during which a layer of snow prevails on the surface of the ground; the region of maximum number of days (190) extends from Archangel east-southeastward to the Ural and beyond. From this region the number of days during which snow lies on the ground diminishes as we proceed southward until we reach 60 days on the northern shores of the Caspian Sea and 20 days on the northwestern shores of the Black Sea. Chart 84 gives the number of days with thunderstorms, the maximum being 20 at many places, but especially in a belt extending from Nijni-Novgorod and Kazan southwestward to the borders of Roumania. The last five charts show the paths of cyclones and the types of weather in Russia, in so far as this latter depends upon the position of areas of high and low pressure. Although the size of the atlas renders it rather cumbersome, yet the paper and press work being of the finest quality render the whole work a magnificent monument, illustrative of the activity of this great meteorological office.

THE INFLUENCE OF THE LAKES ON TEMPERATURE OF THE LAND.

Mr. John West James, voluntary observer at station, Riley, Ill. (post office address Marengo, Ill.), writes as follows:

Can you kindly inform me, why, so far in the interior of the continent as I am, the east wind is so cold in spring and nearly all summer? My station is 46 miles due west from Lake Michigan, and the

lake is only 60 miles wide in that part, and there is higher ground between me and the lake. Quite often a warm south or southwest wind dies down late in the afternoon to a calm, then all at once, a strong east wind springs up, sending the temperature down very rapidly. Sometimes the east wind stays a day or two, but frequently it goes back by the southeast to south again, and it is warm again by early next morning, sometimes before 10 a. m.

Mr. James's station, Riley, Ill., is about 46 miles west of the nearest point of Lake Michigan, in latitude N. 42° 20′, and it is not at all likely that the diurnal lake breeze, properly so called, extends so far west. On the other hand, the distribution of pressure during August, 1900, has frequently been such as to produce gentle northeast winds on the southwest shore of Lake Michigan, which could easily bring to Riley decidedly cooler air than the southerly winds that ordinarily prevail at this season. The daily morning maps for August, 1900, show six cases in which northeast winds prevailed at 8 a. m.; nineteen cases in which southerly winds prevailed, and six cases in which the region of Riley lay between the regions of northerly winds and southerly winds. These latter are simply six cases in which the change from northerly to southerly, or the reverse, happened to occur at about the time of the morning observations. The other six cases of northeast winds at 8 a. m., must have been accompanied by six corresponding changes from southwest to northeast at some other hour of the day. We infer, therefore, that there were at least twelve cases during the month at Riley, when the wind changed from southwest to northeast, and that all these were general phenomena progressing slowly with the large areas of high and low pressure over the region of Lake Michigan and occurring eventually as often on the east side of the lake as on the west. The coldness of the northeast winds was, therefore, due to the general advance southward of a cool layer of air. It is likely that the air flowing due southward over half the length of the lake, has its temperature sensibly affected by that of the lake water, and would seem cooler at stations on the lake shore, but this influence would be scarcely appreciable at stations 50 miles distant.

Temperature and wind at 8 a. m., 75th meridian time.

Date.	Chicago, Ill.		Milwaukee, Wis.		Grand Haven, Mich.		Davenport, Iowa.		Dubuque, Iowa.		Riley, Ill.	
	Temperature.	Wind.	Temperature.	Wind.	Temperature.	Wind.	Temperature.	Wind.	Temperature.	Wind.	Temperature.*	Wind.†
	°		°		°		°		°		°	
August 1....	71	e.	66	ne.	62	e.	70	ne.	67	e.	83	s.
2 ...	70	sw.	68	e.	66	se.	72	se.	72	sw.	83	nw.
3....	73	sw.	62	n.	67	e.	70	e.	68	se.	93	sw.
4....	76	sw.	71	sw.	72	se.	76	s.	77	sw.	94	sw.
5....	78	w.	77	w.	75	sw.	77	s.	77	sw.	97	sw.
6....	79	sw.	77	sw.	77	sw.	78	s.	76	se.	96	sw.
7....	78	sw.	78	sw.	76	sw.	77	sw.	77	sw.	95	sw.
8....	76	sw.	79	w.	76	sw.	76	s.	77	s.	95	sw.
9 ..	76	sw.	78	w.	77	s.	77	sw.	77	s.	95	w.
10 ..	78	sw.	77	sw.	76	sw.	76	sw.	75	sw.	95	sw.
11....	76	sw.	76	w.	77	sw.	76	sw.	74	s.	93	sw.
12 ...	68	s.	70	sw.	68	e	69	w	70	sw.	82	nw.
13....	69	se.	64	sw.	63	calm	72	w.	68	sw.	85	nw.
14....	73	sw.	72	w.	75	sw.	65	ne.	66	ne.	82	sw.
15....	71	nw.	68	s.	64	se.	70	ne.	69	s.	73	ne.
16 ...	68	n.	66	w.	65	nw	69	se.	69	s.	76	se.
17....	71	s.	67	w.	67	se.	68	n.	68	e	75	e.
18....	74	se.	72	se.	71	se.	77	s.	73	se.	92	sw.
19....	79	sw.	78	w.	80	s.	78	s	79	s.	90	sw.
20....	77	sw	77	w.	76	sw.	78	sw.	80	s.	92	sw.
21....	70	ne.	68	n.	70	calm.	78	sw.	72	nw.	81	ne.
22....	73	se.	72	se.	64	e	68	e.	67	e.	84	e.
23....	72	n.	66	sw.	68	se.	73	w.	72	se.	87	sw.
24....	74	s.	70	se	68	se.	71	w.	68	s.	84	sw.
25....	70	sw.	70	sw.	71	se.	69	sw.	68	sw.	83	sw.
26....	68	e.	70	se.	70	ne.	71	s.	70	s.	74	nw.
27....	69	nw	66	w.	68	n.	67	s.	64	se.	83	w.
28....	73	nw.	71	w.	70	calm	70	n.	68	nw.	85	nw
29....	72	ne.	72	ne.	61	ne.	70	e	62	nw.	84	nw.
30....	74	se.	68	sw.	65	se.	68	e.	67	se.	86	se.
31....	72	se.	68	ne.	65	e.	69	e.	68	e.	88	se.

*Maximum temperatures; No observations at 8 a. m.
†Prevailing direction for the day.

The preceding is the 8 a. m. record for Milwaukee, Chicago, Grand Haven, Davenport, and Dubuque during August, 1900. Riley is situated in the midst of this quadrangle and its record of maximum temperatures is also given. As the changes at Riley from warm southerly to cool easterly winds are not regular diurnal, it is probable that they depend upon the presence of the high and low areas; but the fact that the change takes place late in the afternoon seems to show that the heating of the surface air assists the southward flow of the cold air from a high area and causes the southern limit, to which the northerly winds extend, to lie further south than it otherwise would; probably it lies further south in the afternoon and retreats at night-time, so that the boundary between the northerly and southerly winds has a diurnal oscillation in latitude, and this may be much more decided in the spring and early summer than at any other season of the year. In central Michigan the Editor has often observed the flow south and west of very low clouds while the air at the earth's surface was quite calm in the early mornings of May and June. The cloud is formed like a long roll between an upper and lower current of air; the lower current nearly calm or from the south, the upper current cooler and from the northeast.

In the spring time the masses of cold air that invade the United States from Canada during the winter time have begun to diminish in extent and intensity; by the time they have passed over the Lake region the northerly winds have become appreciably warmer and moister, although still raw and cold, as compared with the summer time. When a station lies near the front of the advancing cold wave, but still within the area of warm southerly winds, the latter will prevail over it for a portion of the day, but the former for another portion, while variable winds and calms occur between times. During the late hours of the night, while a calm prevails at the earth's surface, with low temperatures, due to nocturnal radiation, one may see light clouds overhead, moving rapidly from either north or south, according to the observer's position relative to the mass of cold air coming from the north. After the sun warms up the ground and its calm air rises, the upper winds descend, and we have northerly or southerly winds in the respective cases. The temperature of the wind that comes down in such cases depends very little upon the presence of a lake or other feature of the earth's surface in the neighborhood, since this layer of air has come rapidly from a great distance. If it is northerly wind, it brings with it the low temperatures of the arctic zone; if a southerly wind, it brings the temperatures of the tropics. These temperatures have, of course, been somewhat modified by the radiation of their own heat and by the absorption of heat from other sources, as also by mixture with the intervening air; but the effect of Lake Michigan upon these great masses of upper air is very slight. The northeast wind is cold in the spring time not merely at Riley, Ill., but throughout the whole north temperate zone. Its cold is aggravated in certain regions, such as the coast of New England, by the fact that it brings cold, moist air from the cold ocean current that bathes the shores. The same is true of the immediate western coast of Lake Michigan, because of the fog and cloud formed from the moisture that rises from the lake; but we doubt whether this influence can be appreciable at Riley, 46 miles to the west.

In the early summer of 1900 a number of paragraphs appeared in the Chicago papers commenting upon the unusual coolness of the season and attributing the change of climate to the local influence of the gentle surface current setting southward over Lake Michigan and through the new Chicago canal. It was scarcely necessary to contradict this newspaper extravaganza, but the idea that this current could affect the general temperature of the northeast winds is to be answered

very much as we would reply to the above correspondent, viz: that the north and east winds are cold in and of themselves, quite independent of the temperature of Lake Michigan, and if they do produce cold weather at Chicago or at Riley station it is not because the Chicago River has drawn cold water to the southern part of the lake nor because the lake has a cooling influence on the air as far west as Riley station.

The direct influence of the lake water upon the temperature of the air is appreciable for a few miles only; the indirect influence, by reason of the formation of cloud and rain, may be felt for 50 miles. This subject was studied very thoroughly by Prof. Alexander Winchell, of Ann Arbor, Mich., in a paper published in the Proceedings of the American Association for the Advancement of Science for 1870, Vol. XIX, pp. 106–117. Two charts accompanied this paper showing the mean monthly temperatures for July and January. It may be assumed that the means were taken by the ordinary rule 1/4 ($7+2+2\times9$). These charts show a great irregularity in the isotherms, which irregularities may be ascribed in part to direct atmospheric action, since the Lake region is a cloudy and rainy region toward which all the storm tracks of the American continent converge; it is also the region where warm southerly and cool northerly winds mingle with a special frequency. Owing to the cloud, rain, and storm frequency this is also a region of heavy forests and lakes and swamps, both large and small. The latter are undoubtedly the product of the former. It is not right to say that the Lake region is cool, stormy, and moist because of the lakes, but because of the presence of the storms.

If the lakes have any decided influence on the temperature it must be only a slight differential effect, which would become visible by comparing the temperatures on opposite sides of a lake when the general wind is blowing steadily in one direction. Professor Winchell's isotherms for July show that stations on opposite sides of Lake Michigan, directly east and west of each other and close to the lake shore, have precisely the same temperature from Chicago and New Buffalo, at the south end up to Mackinaw at the north. His isotherms for Lake Ontario show almost the same thing. His isotherms for January, on the other hand, show that the west coast of Lake Michigan is 5° or 10° colder than the east shore, that is to say, the air whose temperature averages between 20° and 30° grows slightly warmer as the west winds of January blow eastward over the frozen lake. In crossing over the Peninsula of Michigan from west to east temperatures generally grow colder by 3° or 4°, due to the fact that the warming influence of the clouds on the east shore of Lake Michigan disappears as we proceed toward the east. Thus, the January isotherm of 23°, passing near Chicago, runs northward to Northport, Mich., thence south to Lansing, then north until it nearly reaches Alpena, and thence eastward over Lake Huron, and southeast into New York.

HYDROGRAPHY OF NICARAGUA.

For several years past we have published in the MONTHLY WEATHER REVIEW all the meteorological data that have been offered to us relative to the climate of Central America, especially Panama and Nicaragua. These publications have been appreciated by those who are studying the conditions that must attend any effort to construct inter-oceanic canals across those portions of Central America. Through the activity of the engineers employed by the boards appointed by Congress to investigate the feasibility of a canal between the Atlantic and Pacific Oceans (viz: the "Canal Board of 1895," the Nicaragua Canal Commission of 1897, and the Isthmian Canal Commission of 1899), a large addition has been made during the past five years to our knowledge of the climate of Central America. In the Twentieth Annual Report of the United States Geological Survey is given a review of the rainfall data and the height and flow of rivers and the fluctuations of Lake Nicaragua (as also the evaporation of water, the formation of river sediments, and other matters affecting the canal question) in a short paper on the hydrography of Nicaragua by Arthur P. Davis, of the United States Geological Survey, Engineer to the Nicaragua Canal Commission of 1897. Still more recent data will, undoubtedly, be presented to Congress in the final report of the Isthmian Canal Commission appointed to decide on the relative merits of the various proposed canals.

OFFICIAL ORGANS.

All communications between the Chief of the Weather Bureau and the observers, both regular and voluntary, proceed by formal letters or circulars and are never sent through any official organ, so-called. For fear lest some mistake may be made in the minds of our readers it is proper to say that whatever is printed in the MONTHLY WEATHER REVIEW under the name of any contributor, officer, or editor is to be viewed as a personal expression and without any official authority, unless that phrase is expressly used by the Chief himself, or his authorized representative.

Not long since a circular was received announcing the establishment of a new journal to be published in the interest of the voluntary observers of the Weather Bureau. These observers have been voluntarily keeping weather records and communicating copies to the Weather Bureau for the public benefit, and the Weather Bureau, in return, has done for them all that it is officially able to do in the way of supplying public documents and, in exceptional cases, thermometers and other instruments.

The first letter received by the Chief of Bureau relative to the new journal, spoke of it as the organ of a scientific society, and to that letter a most cordial response was given, but no article was "contributed" by the Chief. The subsequent letter and circular, and the first number itself of the journal, shows that it aspires to be the official organ of the voluntary observers of the Weather Bureau, a project to which the Chief of the Weather Bureau can not possibly be expected to lend any encouragement. As a journal of meteorology, climatology, and allied sciences Earth and Air is to be heartily encouraged by the Weather Bureau, just as it encourages Popular Science and all other scientific journals, but there is no need for its existence as an official organ.

THE WEATHER OF THE MONTH.

By ALFRED J. HENRY, Professor of Meteorology.

The month was characterized by general stagnation in the lower layers of the atmosphere. East of the Rocky Mountains and north of the Gulf States the weather was abnormally warm, the monthly mean temperatures surpassing, in many instances, those registered in tropical countries. The skies were generally free from clouds, especially at night, and rainfall was deficient over large areas east of the Mississippi. In Nebraska, the Dakotas, Minnesota, northern Wis-